National Aviation Operations Monitoring Service (NAOMS) Phase 2 Survey Response Redaction Summary With Frequently Asked Questions

Sept. 30, 2008

This document summarizes the redaction strategy and steps applied to the raw NAOMS survey responses collected between April 2001 and December 2004. This redaction constitutes the basis for NASA's Phase 2 release of the NAOMS air carrier and general aviation pilot responses. The intent of Phase 2 is to release the maximum amount of survey information, while ensuring

- No release of commercial confidential information
- Survey participant confidentiality
- Minimal threat to participant anonymity

Phase 1 (released on Dec. 31, 2007) and the Phase 1A update (released on Feb. 6, 2008) are still available for public access through the NASA's NAOMS website, http://www.nasa.gov/news/reports/NAOMS.html.

Please note that the survey responses and the methodology used to acquire them, have not been peer-reviewed to date. Accordingly, no product of the NAOMS project, including the survey methodology, the survey responses, and any analysis of the responses, should be viewed or considered at this stage as having been validated.

How are Phase 2 redacted survey responses structured?

The NAOMS questionnaires consist of two separate surveys, one for air carrier pilots and the other for general aviation pilots. Each survey has four parts:

- Section A: pilot background questions
- Section B: safety-related events
- Section C: in-close approach changes and Commercial Aviation Safety Team (CAST) Joint Implementation Measurement Data Analysis Team (JIMDAT) questions [CAST JIMDAT is a Government-industry group that developed a baseline for aviation system performance measures through responses to a set of questions.]
- Section D: questionnaire feedback

Phases 1 and 1A Responses

Section A, B, C, and D responses were linked so that specific pilot responses could be traced through all questions asked except as outlined in the NAOMS Survey Response Redaction Summary (Feb. 6, 2008). These are the primary exceptions:

- Rare events were disaggregated and summarized in tables.
- Some free text responses were disaggregated from the parent survey.
- High unique response entries were replaced with the next closest numeric value in the field. A high unique event was an event where a pilot responded with a value that was unusually high in comparison to those of the other survey respondents.

Section A (pilot background) responses were highly generalized except where "partial raw" data were provided on limited Section A responses. For example, actual flight hours and legs are shown together but cannot be linked to any other pilot attributes or safety event responses. Other partial raw data were compiled separately for aircraft make/model/series and for career hours.

Phase 2

Sections B, C, and D subparts with responses from Section A affixed

Sections B, C, and D were broken into Microsoft Excel worksheet tables. Each table consists of all the pilot raw survey responses for an individual question. The year in which the survey was conducted and the redacted hours, legs/takeoffs, and aircraft information from Section A are affixed to each numerical response in Sections B, C, and D. Free text is excluded from having any Section A attributes affixed to it. In the resulting data tables, rows in these tables are arranged randomly within the year so that information in any data table cannot be linked to information in any other data table. Breaking the survey sections into individual questions made it possible for additional information (i.e., legs/takeoffs and make-model) to be affixed from Section A and for all rare and unredacted high unique events to be included without increasing pilot disclosure risk significantly.

Excel files were created for the questionnaire topics in order to aide searches for specific survey responses. For example, the "Medical Emergencies and Passenger Disturbance" Excel file contains the questions CP1, CP2, and CP3 related to that topic. These responses are contained in individual tables identified by worksheet tabs in the Excel file. Again, none of the response rows in one table can be linked to the corresponding response rows in another table.

Note: Because some raw numerical responses in Section B, C, and D are coded to a unique meaning (e.g., "997" means refused to answer), it may be possible to misinterpret column totals and entries. Please refer to the "National Aviation Operations Monitoring Service (NAOMS) Phase 2 Information Release Survey Response Disclaimer."

Free text

Free text was disaggregated from the rest of the survey and randomized, similar to what was done in Phases 1 and 1A. However, the less conservative redaction guidelines noted below were applied in order to maintain acceptable pilot disclosure risk while releasing more information. None of the Section A attributes are affixed to the free text responses. All redacted free text is denoted by brackets in the free text responses (e.g., [airline], [text redacted], [airport], etc.).

Total hours and legs/takeoffs by aircraft and year

Only the primary, or most-used, aircraft was affixed to the Section B, C, or D numerical responses. A table was generated to assist users in understanding the total hours and total legs/takeoffs represented for a given aircraft make-model or aircraft category during the reporting period for all pilots. This table was not previously provided in Phase 1. This table sums all the hours for a given aircraft used during the reporting period--up to six aircraft for each pilot surveyed. The survey did not ask the pilot for the breakdown of legs (unlike for flight hours) or takeoffs for each aircraft flown. In order to approximate the total legs (or takeoffs), the redactors assumed that the percentage of legs (or takeoffs) split by aircraft was equivalent to the percentage of flight hours split by aircraft.

Actual hours and legs/takeoffs by year

The actual raw hours, legs/takeoffs, and year information were recalculated for Phase 2. These calculations are similar to the partial raw data included in Phases 1 and 1A. For Phase 2, the data were recompiled into one file containing information that was not subjected to quality assurance processes. The Phase 2 data file may be used to understand the distribution of data for a given hour, leg, or takeoff bin in the subparts defined below.

What additional information was released in Phase 2?

The following summarizes the additional information released in Phase 2:

<u>Air Carrier</u>

1. Two relevant pilot background information (questionnaire Section A) attributes were tied to safety-related responses:
    a. Legs flown during the reporting period (this information was not affixed to safety responses in Phase 1)
    b. Make-model of primary aircraft (only aircraft category was used in Phase 1). In some cases, aircraft make was used without the model to protect pilot anonymity.

Pilot background information from Section A responses--interview year, hours and legs flown in reporting period, and the most used aircraft make-model or, in some cases, aircraft make only--were affixed to each individual survey response (in Sections B, C, and D) as a topical data set. All responses having free text were disaggregated from all Section A, B, C, and D responses.

2. Survey responses now include all 28 rare events and 20 unredacted high unique events not released in Phase 1.

3. More information was released in the NAOMS free text responses unless it presented unacceptable risk to pilot anonymity. Additional information generally includes
    a. Names of airports, navigational fixes, or geographic locations
    b. Aircraft make and model
    c. Names of actual aircraft systems

4. No filtering or quality assurance was performed on the numerical data unless it was part of the redaction or binning process (e.g., hours were binned) for Section A responses. All numerical responses in Sections B, C, and D are presented in their raw state except for responses that included month and year. In these cases the month was deleted.

5. Incomplete survey responses (approximately 65) which were not released in Phase 1 were included as part of the Phase 2 release. These were interviews that were started but, for unknown reasons, were cut short.

<u>General Aviation</u>

1. Two relevant pilot background information (Section A) attributes were tied to safety-related responses:
    a. Legs flown during the reporting period (this information was not affixed to safety responses in Phase 1)
    b. Category of primary aircraft (no aircraft descriptions were linked to safety events in Phase 1).

    Pilot background information from Section A responses--interview year, Federal Aviation Regulation (FAR) Part 135/91 hours and takeoffs flown in reporting period, and most used aircraft category--is affixed to each individual survey response in Sections B, C, and D as a topical data set. All responses with free text were disaggregated from all Section A, B, C, and D responses.

2. Survey responses now include all 19 rare events not previously released in Phase 1.

3. More information was released in the NAOMS free text responses unless it presented an unacceptable risk to pilot anonymity. Additional information generally includes:
    a. Names of airports, navigational fixes, or geographic locations

b. Aircraft category
c. Names of actual aircraft systems

4. No filtering or quality assurance was performed on the numerical data unless it was part of the redaction or binning process (e.g., hours were binned) for Section A responses. All numerical responses in Sections B, C, and D are presented in their raw state except for responses that included month and year. In these cases the month was deleted.

How was the Phase 2 data release determined?

The NAOMS team undertook several research activities to ensure the release of the maximum amount of NAOMS information while maintaining risk to pilot anonymity at an acceptable level. These activities included

1. Considered the redaction recommendations of the NAOMS Information Release Advisory Panel (2008) based on its extensive interviews with stakeholders and research into NASA's obligation to protect pilot anonymity and confidentiality.
2. Consulted professional air carrier and general aviation pilots and air traffic control organizations and experts.
3. Consulted aviation safety database experts familiar with effective redaction techniques and data mining risks.
4. Consulted statistical and data mining experts on redaction and disclosure risk analysis techniques and methodologies.
5. Reviewed federally accepted data disclosure protocols such as Federal Committee on Statistical Methodology: Statistical Policy Working Paper 22—Report on Statistical Disclosure Limitation Methodology. Office of Management and Budget, Dec. 2005. http://www.fcsm.gov/working-papers/spwp22.html.
6. Performed a comparative disclosure analysis on Phases 1 and 1A redacted information and Phase 2 redacted information to ensure comparable levels of pilot disclosure risk.
7. Performed data set linkage analysis between Phases 1 and 1A and Phase 2 as well as between Phase 2 data tables.
8. Queried publicly available databases toward identifying pilot disclosure risks on rare and high unique events defined in Phases 1 and 1A.

Should the Phase 2 information replace Phase 1 information?

Phase 2 and Phase 1 information cannot be linked; however, the two data releases may be used separately or jointly to provide users with the maximum information possible. Generally speaking, if a user wants to look at several unrelated events with generalized pilot background attributes, Phases 1 and 1A information may be more useful. If a user is interested in specific questions with more precise information on aircraft type, Phase 2 information may be more useful. Also, the Phase 2 parent survey includes all the rare and unredacted high unique events that are not available in Phases 1 and 1A.

Phase 1 provides several combined partial raw data sets on aircraft make/model/ series, pilot career hours, and period hours and legs/takeoffs that were not linked to any other Section A, B, C, or D responses. This information, not fully provided in Phase 2, can be referenced for specific user applications.

What was not released for Phase 2 or Phase 1?

For Phase 2, all of the numerical responses with the exception of certain time increments (i.e., month) were released for Sections B, C, and D, including the rare and high unique events. However, to minimize pilot disclosure risk, several Section A or pilot attribute responses were not included. The Phase 2 release contains more information on hours, legs or takeoffs, and type of primary aircraft used. The Phase 1 release contains more Section A attributes than Phase 2 but was highly redacted. Please refer to the NAOMS Survey Response Redaction Summary (http://www.nasa.gov/pdf/210312main_NAOMS%20Redaction%20Summary%206%20Feb%20Final.pdf) dated Feb. 6, 2008, for the content of the Phase 1 redacted responses.

Redaction Steps for Phase 2

Only four Section A pilot attributes--year, hours, legs/takeoffs, and primary aircraft used--were matched to each numerical survey response for Phase 2. These four attributes were redacted as follows and then affixed to each numerical Section B, C, and D numerical response.

<u>Air Carrier</u>

Year: Actual interview year

Hours Flown: Flight hours (question A1) during the reporting period were placed in the following bins: Less than 46, 46 to 70, 71 to 100, 101 to 120, 121 to 150, Greater than 150

Legs Flown: Flight legs (question A2) during the reporting period were placed in the following bins: Less than 14, 14 to 22, 23 to 36, 37 to 60, Greater than 60

Primary Make and Model Flown: Primary aircraft (question A3) used during the reporting period were placed in the following bins:

Aircraft Make-Model or Make Only
B737
B757
B727
MD80_MD90 Models
B767
B747
B777
A320_A321
DC9_B717
DC10_MD10
MD11
A300
A319
DC8
Cessna
Fokker
Bombardier
Embraer
Small_or_Other
A310
Beechcraft
Gulfstream
Learjet
Unknown
A330
Hawker_Hawker Siddeley
Dassault
British Aerospace
Lockheed
de Havilland
Douglas_McDonald Douglas
Saab
Fairchild_Dornier
Piper

The “Small_or_Other” category includes known aircraft that could not be placed in any other bin and that generally had low counts in comparison to other make-model or make bins. The “Unknown” bin was used when pilot information was insufficient to correctly recognize an aircraft with confidence. This response occurs because respondent refused to answer, answered “unknown” or due to inability to interpret typographical and spelling errors introduced by the interviewer.

Other redaction in Sections B, C, and D

All numerical responses in Sections B, C, and D are presented in their raw state unless the responses included month and year (e.g., training). In these cases, only the year is provided.

If at least three air carriers operated from an airport, the airport name was released unless other information could be used with the airport name to identify the air carrier or pilot.

General Aviation

Year: Actual interview year

Federal Aviation Regulation (FAR) Part 135/91 Hours Flown: Survey responses to questions GA5 and GA6 were summed to determine FAR Part 135/91 total flying hours during the reporting period. The resulting values were placed in the following bins:

Flight Hours
Less than 5
5 to 9
10 to 14
15 to 19
20 to 24
25 to 29
30 to 34
35 to 39
40 to 44
45 to 49
50 to 54
55 to 59
60 to 64
65 to 69
70 to 74
75 to 79
80 to 84
85 to 89
90 to 94
95 to 99
Greater than 99
(Don't Know)

FAR Part 135/91 Takeoffs: Survey responses to questions GA8, GA9, GA10, and GA11 were summed to determine FAR Part 135/91 total takeoffs during the reporting period. The resulting values were placed in the following bins:

Flight Takeoffs
Less than 5
5 to 9
10 to 14
15 to 19
20 to 24
25 to 29
30 to 34
35 to 39
40 to 44
45 to 49
50 to 54
55 to 59
60 to 64
65 to 69
70 to 74
75 to 79
80 to 84
85 to 89
90 to 94
95 to 99
Greater than 99
(Don't Know)
(Missing Information)
(Refused to Answer)

Primary Aircraft Category Used: Primary aircraft used during the reporting period (question GA13) were placed in the following bins:

Aircraft Category
Fixed wing single engine
Fixed wing multi engine
Rotorcraft
Other
Unknown

The “Other” category includes balloons, powered parachutes, and gliders. The “Unknown” bin was used when pilot information was insufficient to correctly recognize an aircraft with confidence. This response occurs because respondent refused to answer, answered “unknown” or due to inability to interpret typographical and spelling errors introduced by the interviewer.

Other redaction of Section B, C and D

All numerical responses in Sections B, C, and D are presented in their raw state unless the responses included month and year (e.g. training). In these cases only the year is provided.

The airport name was released unless other information could be used with the airport name to identify a fixed base operator or pilot.

Some select Section B questions asked for aircraft make and model that experienced a respective event. These select responses have been deleted. The numerical responses for the event are affixed to only interview year, hours, takeoffs, and primary or most used aircraft category.

Section B, C, and D Excel Files

Select questions were grouped into common Excel data files in different Excel worksheets (tabs) for ease of use and search by a user. All Section B, C, and D responses were grouped into the following categories, with bold type indicating that there is a separate Excel file containing survey responses related to that category.

Air Carrier Survey Responses (survey question number)

Actual Hours and Legs by Year (A1 and A2)

Airborne Conflicts

- **Bird Strikes (AC1)**
- **Near Midair Collisions (AC2 and AC3)**

Aircraft Flight Operations

- **Accepted Clearance That Could Not Comply With (AH2)**
- **Altitude Deviation, Descent Below Minimum Descent Altitude (MDA) (AD1 to AD2)**
- **Hard Landing (AH9)**
- **Land or Takeoff Without Clearance (AH4, AH5)**
- **Lost Sight of Another Aircraft (AH3, AH3.A)**
- **Nearly Collided With Terrain While Airborne (AH15 to AH15.C.1)**
- **Overweight Takeoffs (AH11)**
- **Tail Strike During Takeoff or Landing (AH7, AH8)**
- **Takeoffs With Improper Configuration (AH12)**
- **Takeoffs With Out-of-Limit Center of Gravity (CG) (AH10)**
- **Track Deviation (AH6)**
- **Unusual Attitude or Stall Warning (AH13 and AH14)**
- **Used Reserve Fuel (AH1)**

Aircraft Make-Model, Total Hours and Total Legs (A1, A2, A3A)

Airline Management and Safety Culture (JD30 to JD34.A)

Equipment Abnormalities

- **Diversions (ER1, ER1.A)**
- **Engine Shutdowns or Failures (ER6, ER7)**
- **Hazmat Incidents or Cargo Shifts (ER2 to ER3)**
- **Smoke, Fire, or Fumes (ER5.A to ER5.F.3)**
- **Uncommanded Aircraft Surface Movements (ER4.A to ER4.I.2D)**

Ground Operations

- **Collided or Nearly Collided With Another Aircraft While Both on Ground (GE10 to GE10.C)**
- **Collided or Nearly Collided With Ground Vehicle (GE2 to GE2.C)**
- **Landing Skids (GE3)**
- **Rejected Takeoff (GE4)**
- **Runway Incursions (GE7)**
- **Runway or Taxiway Excursions (GE1, GE5, GE6)**
- **Takeoff or Landing Conflicts With Other Aircraft (GE8, GE9)**

In-Close Approach Changes (ICAC)

- **Flight Changes From Most Recent Unrequested Clearance Change (IC8 to IC14.E)**
- **Flight Management System/Flight Management Computer (FMS/FMC) Use in Most Recent Clearance Chance (IC4 to IC7)**
- **Location and Aircraft Information of Most Recent Clearance Change (IC2 to IC3)**
- **One Unrequested Clearance Change (IC1 to IC1B1.10.A)**
- **Reasons for Most Recent Unrequested Clearance Change (IC15 to IC16.D.1)**
- **Two or More Unrequested Clearance Changes (IC1.A2 to IC1.C.10)**

Interactions With Air Traffic Control (ATC)

- **High Altitude or Airspeed on Approach (AT2)**
- **Unable To Communicate With Air Traffic Control (ATC) Because of Frequency Congestion (AT1 to AT1.C)**

Medical Emergencies and Passenger Disturbance (CP1 to CP3)

Missed-Approach Policy (JD25 to JD26.B)

Pilot Training

- **Cockpit Resource Management (CRM) Training (JD24 to JD24.D)**
- **Controlled Flight Into Terrain (C-FIT) Training (JD22 to JD22.J)**
- **Recurrent Training (JD20 to JD21.E)**
- **Upset-Recovery Training (JD23 to JD23.C)**

Questionnaire Feedback (D1 to D5A)

Safety Reporting Programs

- **Aviation Safety Action Program (ASAP) (JD27 to JD28.B)**
- **Flight Operations Quality Assurance (FOQA) Program (JD29 to JD29.D)**

Standard Operating Procedures (SOPs) (JD13 to JD19)

Terminal Operations and Instrument Approach Events

- **Constant-Angle Approaches (JD6 to JD7.A)**
- **Distance-Measuring Equipment (DME) (JD10 to JD11.A)**
- **Ground Proximity Warning System/Enhanced Ground Proximity Warning System (GPWS/EGPWS) (JD1 to JD2.B)**
- **Lateral Navigation/Visual Navigation (LNAV/VNAV) (JD8 to JD8.B.1)**
- **Minimum Safe Altitude Warning (MSAW) (JD3 to JD3.B.1)**
- **Non-Precision Approaches (JD4 to JD5.A)**
- **Required Navigation Performance (RNP) (JD9 to JD9.C.1)**
- **Visual Approach Slope Indicator/Precision Approach Path Indicator (VASI/PAPI) (JD12 and JD12.A)**

Weather

- **Aircraft Icing (WE4)**
- **Diversion Because of Weather (WE3)**
- **Severe Turbulence (TU1 to TU1.B)**
- **Wake Turbulence (TU2)**
- **Weather Information (WE1 to WE2.A)**
- **Windshear or Microburst (WE5, WE6)**

General Aviation Survey Responses

Actual Hours and Takeoffs by Year (GA5, GA6, GA8 to GA11)

Airborne Conflicts

- **Bird Strikes (GAC1)**
- **Near Midair Collisions (GAC2, GAC3)**

Aircraft Category, Total Hours, and Total Takeoffs (GA8 to GA11, GA13.1 to GA13.6, GA13.1A to GA13.6A)

Aircraft Flight Operations

- **Accepted Clearance That Could Not Comply With (GAH2)**
- **Airplane Stall Warning (GAH11.A)**
- **Altitude Deviation (GAD1)**
- **Crossed Threshold With Gear Up (GAH13.A, GAH13.A.A)**
- **Descended Below Minimum Safe Altitude (MSA) (GAD2)**
- **Deviated From Route or Vector (GAH6)**

- **Entered Airspace Without Clearance (GAH14)**
- **Helicopter Low Rotor RPM Warning (GAH11.H)**
- **Land or Takeoff Without Clearance (GAH4, GAH5)**
- **Lost Horizon (GAH15)**
- **Lost Sight of Aircraft (GAH3, GAH3.A)**
- **Near Collision With Terrain (GAH12 to GAH12.C)**
- **Overweight Takeoffs (GAH8)**
- **Takeoffs With Improper Configuration (GAH9.A)**
- **Takeoffs With Out-of-Limit Center of Gravity (CG) (GAH7)**
- **Unusual Attitude (GAH10)**
- **Used Reserve Fuel (GAH1)**

Distracted by Passengers (GCP1)

Equipment Abnormalities

- **Attitude Indicator Failures (GER13 to GER13.B)**
- **Bogus Parts (GER7)**
- **Cargo Shifted or Came Loose (GER10)**
- **Contaminated Fuel (GER11)**
- **Diversions (GER1 to GER1.B)**
- **Doors or Cowlings Opened Inadvertently in Flight (GER8)**
- **Doors or Windows Came Off During Flight (GER9)**
- **Engine Shutdowns or Failures (GER4, GER5)**
- **Smoke, Fire, or Fumes (GER3.A to GER3.E.1.1)**
- **Total Loss of Electrical Power (GER6)**
- **Uncommanded Airplane Surface Movements (GER2.A.A to GER2.A.G.2)**
- **Uncommanded Helicopter Surface Movements (GER2.H.A to GER2.H.G.2)**
- **Wrong Fuel (GER12)**

Ground Operations

- **Aborted Takeoffs (GGE3)**
- **Airplane Collided or Nearly Collided With Ground Vehicle (GGE12.A to GGE12.A.C)**
- **Airplane Hit Runway or Taxiway Lights (GGE10.A)**
- **Airplane Nearly Collided With Another Aircraft While Both on Ground (GGE14.A to GGE15.A)**
- **Airplane Runway Incursions (GGE7.A)**
- **Airplane Runway or Taxiway Excursions (GGE4.A, GGE5.A, GGE6.A)**
- **Helicopter Collided or Nearly Collided With Ground Vehicle (GGE13.H to GGE13.H.C)**
- **Hit Animal (GGE11)**
- **No Wind Indicator (GGE1)**
- **Takeoff or Landing Conflicts With Other Aircraft (GGE8.A, GGE9.A)**
- **Takeoffs With Protective Gear (GGE2)**

Interactions With Air Traffic Control (ATC)

- **High Altitude or Airspeed on Approach (GAT2)**
- **Left Frequency for Weather (GAT3)**
- **Missed Transmission (GAT4 to GAT4.B.1)**
- **Notices to Airmen (NOTAMS) (GAT5)**
- **Unable To Communicate With Air Traffic Control (ATC) (GAT1 to GAT1.C)**

Questionnaire Feedback (GD1 to GD5What)

Weather

- **Aircraft Equipment for Instrument Flight Rules (IFR) (GC17.A to GC17.C)**
- **Aircraft Icing (GWE3.A, GWE3.H)**
- **Diversions Because of Weather (GWE2.A, GWE2.H, GC10 to GC10.A.1)**
- **Go-Around (GC9 to GC9.B)**
- **Helicopter Lost Horizon (GWE7.H)**
- **Inadvertent Instrument Meteorological Conditions (IMC) (GC8 to GC8.B.1)**
- **Instrument Approaches to Landing in IMC (GC18 to GC18.C)**
- **Instrument Approaches to Landing in IMC Under Federal Aviation Regulation (FAR) Part 91 (GC19 to GC20.D)**
- **Instrument Flight Rules (IFR) Flight Plans (GC15, GC15.A)**
- **Instrument Flight Rules (IFR) Minimums (GC16 to GC16.B)**
- **Instrument Training (GC12 to GC14)**
- **Lost Tail Rotor Effectiveness (GWE5.H, GWE6.H)**
- **Lost Track of Position Because of Weather (GC6, GC6.A)**
- **Most Recent Weather Information Source (GC2 to GC3.1)**
- **Severe Turbulence (GTU1 to GTU1.C)**
- **Spatial Disorientation Because of Weather (GC7, GC7.A, GC7.B)**
- **Visual Flight Rules (VFR) on Top (GC11 to GC11.A.1)**
- **VFR Takeoffs (GC4)**
- **VFR Weather Minimums (GC5, GC5.A, GC5.B)**
- **Wake Turbulence (GTU2)**
- **Weather Information (GWE1 to GWE1.E)**
- **Weather Information Source (GC1 to GC1.A.7.A)**
- **Windshear or Microburst (GWE4)**

Rare and High Unique Event Responses Released in Phase 2

Air Carrier Rare Events (question numbers in parenthesis)

1. Hazmat Incidents in Passenger Compartment (ER2.B)
2. Hazmat Incidents Because Materials Out of Compliance With Regulations (ER2.C)

3. Smoke, Fire, or Fumes in Engine/Nacelle Involving Electrical Components/Wiring (ER5.A.1)
4. Smoke, Fire, or Fumes in Cargo Hold Involving Electrical Components/Wiring (ER5.C.1)
5. Went Off Edge of Runway/Taxiway While Taxiing (GE1)
6. Collided/Nearly Collided [with ground vehicle] on Runway (GE2.C)
7. Went Off Edge of Runway During Takeoff/Landing (GE5)
8. Went Off End of Runway (GE6)
9. Nearly Collided [with another aircraft] on Runway (GE10.C)
10. Began Takeoff Roll Without ATC Clearance at Airport With Active Control Tower (AH5)
11. Tail Strike on Takeoff (AH8)
12. Nearly Collided With Terrain or Ground Obstruction While Airborne (AH15)
13. Near Collision Brought to Attention by ATC (AH15.A)
14. Near Collision Detected Through Direct Sighting (AH15.B)
15. Near Collision Detected Through Ground Proximity Warning System or Enhanced Ground Proximity Warning System (GPWS or EGPWS) (AH15.C)
16. Near Collision Detected Through EGPWS (AH15.C.1)
17. Unrequested Clearance Change Resulted in Landing Without Clearance (IC1.B.8)
18. Most Recent Unrequested Clearance Change Resulted in Airborne Conflict? (IC1.C.3)
19. Most Recent Unrequested Clearance Change Resulted in Wake Turbulence Encounter? (IC1.C.4)
20. Most Recent Unrequested Clearance Change Resulted in Landing With Out-of-Limit Tailwinds/Crosswinds? (IC1.C.5)
21. Most Recent Unrequested Clearance Change Resulted in Landing Without Clearance? (IC1.C.8)
22. Most Recent Unrequested Clearance Change Resulted in Ground Conflict? (IC1.C.9)
23. [unrequested clearance change] Reason Included Noise Abatement? (IC15.A.6)
24. [unrequested clearance change] Reason Included ATC Equipment Problems? (IC15.A.7)
25. Received MSAW or Altitude Awareness From ATC? (JD3)
26. Was Enhanced GPWS or Terrain Avoidance Warning System (TAWS) Installed? (JD3.B)
27. Received Feedback From Airline Regarding Missed Approach? (JD26.A)
28. Nature of Feedback on Missed Approach (JD26.B)

<u>Air Carrier High Unique Events</u>

1. Inadvertently Deviated More Than 300 ft From Assigned Altitude (AD1)
2. Inadvertently Landed Without Clearance at Airport With Active Control Tower (AH4)
3. Hard Landing (AH9)
4. Takeoffs With Out-of-Limit [center of gravity] CG (AH10)
5. Overweight Takeoffs (AH11)

6. Commenced Takeoff Roll With Improper Airplane Configuration (AH12)
7. Unusual Attitude (AH13)
8. Valid Stall Warning or Stick Shaker Activation (AH14)
9. Unable To Communicate With ATC Because of Frequency Congestion (AT1)
10. Undesirably High Altitude/Airspeed on Approach Because of ATC Clearance (AT2)
11. Hazmat Incidents (ER2)
12. Hazmat Incidents in Cargo Compartment (ER2.A)
13. Uncommanded Movements of the Speedbrakes (ER4.E)
14. Uncommanded Movements of the Slats (ER4.H)
15. Clearance Change Declined (IC1.A)
16. Unrequested Clearance Change Resulted in Go-Around/Missed Approach (IC1.B.2)
17. Unrequested Clearance Change Resulted in Landing Long/Fast (IC1.B.7)
18. Unrequested Clearance Change Resulted in Ground Conflict (IC1.B.9)
19. Unrequested Clearance Change Resulted in Other Undesirable Event (IC1.B.10)
20. Experience Ground Proximity Warning? (JD2)

General Aviation Rare Events

1. Engine/Nacelle Smoke/Fire/Fumes Involving Electrical Components/Wiring (GER3.A.2)
2. Smoke, Fire, or Fumes Originated in Cargo/Baggage Area (GER3.C)
3. Cargo/Baggage Smoke/Fire/Fumes Involving Electrical Components/Wiring (GER3.C.2)
4. Passenger Compartment Smoke/Fire/Fumes Involving Electrical Components/Wiring (GER3.D.2)
5. Flights/Attempted Flights With Wrong Type of Fuel (GER12)
6. Severe Turbulence Resulting in Occupant Injury (GTU1.C)
7. Airplane Went Off End of Runway (GGE6.A)
8. Hit/Collided With Runway/Taxiway Lights (GGE10.A)
9. Hit Animal Other Than Bird (GGE11)
10. Collided/Nearly Collided With Ground Vehicle on Ramp/Apron (GGE12.A.A)
11. Collided/Nearly Collided With Ground Vehicle on Taxiway (GGE12.A.B)
12. Collided/Nearly Collided With Ground Vehicle on Runway (GGE12.A.C)
13. Nearly Collided [with another aircraft] While on Runway (GGE14.A.C)
14. Began Takeoff Without ATC Clearance at Airport With Active Control Tower (GAH5)
15. Near Collision [with terrain or ground obstruction while airborne] Brought to Attention by ATC (GAH12.A)
16. Near Collision [with terrain or ground obstruction while airborne] Involved Wires Only (GAH12.C)
17. Airplane Crossed Runway Threshold During Landing Approach With Gear Up (GAH13.A)
18. Airplane Landed With Gear Up (GAH13.A.A)
19. Specify How Got Through Cloud Deck to Land (ATC Help) (GC11.A.2)